crown, in the biased state.

SUMMARY OF THE INVENTION

It is therefore an object of the invention to provide a cooling channel cover for a one-piece piston of an internal combustion engine, which cover can be installed easily and quickly, whereby the piston weight is reduced as compared with the known state of the art.

mm plastic/spring steel

This task is accomplished by a <u>one-piece</u> plastic/spring steel ring, U-shaped in cross-section, which has a ring bottom and an outer shank around the circumference that is molded onto the ring bottom and angled off radially to the outside, and an inner shank around the circumference that is angled off radially to the inside. A film hinge radially deflects the ring shank of the plastic ring formed by the hinge, in its positional plane. The ring has a first radial division having a mouth width and a second radial division, approximately opposite the first division, on the circumference, which does not separate the radially angled outer shank that runs around the circumference, to form the film hinge. The U-shaped ring is preferably made of a thermoplastic plastic such as polyphenylene sulfide (PPS) or a polyimide (PI) or a spring steel. In this manner, the cooling channel cover allows very simple and quick assembly on the piston, and a reduction in the piston weight by means of the ~~plastic~~ construction.

or a spring steel

mm

The film hinge is preferably determined by a material thickness of the outer shank. The outer shank is preferably arranged on an outside circumference of the piston crown and is angled off radially to the outside, with reference to a crosswise piston axis, and the inner shank is preferably arranged on the inside circumference of the piston head and is angled off radially to the inside.

In a preferred embodiment, slits that extend to the ring bottom are made in the outer and inner shanks. The slits are non-uniformly distributed over the circumference of the ring, in order to produce a plurality of shanks having different ridge lengths. The film hinge is preferably arranged in a region between the slits. The slits preferably have a width of 2 to 3 mm and the ridge lengths between the slits are 15 to 20 mm.

Preferably, the first radial division having the mouth width forms a cooling oil inlet or a cooling oil outlet for the cooling channel.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects and features of the present invention will become apparent from the following detailed description considered in connection with the accompanying drawings. It is to be understood, however, that the drawings are designed as an illustration only and not as a definition of the limits of the

piston head 4. The incline, in each instance, is characterized by the angle between the axial piston axis 2.1 and the slant of the recess wall, which is approximately 30°. The recesses 14.1 and 14.2 are delimited by a step 15.1 and 15.2, in each instance, which also result in a conically narrowed shape in the direction towards piston shaft 10, and whose aforementioned defined angle has a value of approximately 20 to 30°.

plastic/spring steel

A ring-shaped recess 11 is provided between piston ring band 7 and piston shaft 10, by means of which assembly for closing off the cooling channel 6 by means of a one-piece plastic/spring steel ring 8, U-shaped in cross-section, takes place.

According to the invention, a thermoplastic polymer plastic, such as polyphenylene sulfide (PPS), Ryton R4® or high-temperature polyimide (PI), such as VESPEL® from DuPont or AURUM® from Mitsui Chemicals Inc., is preferably used for this purpose. The abbreviations correspond to the international standard ISO 1043-1 dated 1997. Such plastics are characterized by their resistance to high temperatures, i.e. heat, of 200°C to over 400°C in long-term operation. In addition, the plastic can also be fiber-reinforced. The spring steel can be a std. carbon spring steel like CK 75. Tempering is optional.

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According to Fig. 4, U-shaped plastic ring 8 has a radial outer shank 8.1 angled away from its ring bottom 8.3, and a radial inner shank 8.2 angled away from ring bottom 8.3, the

The spring steel can be a standard carbon spring steel like CK 75. Tempering is optional. mm

shanks being are divided by slits 13 non-uniformly distributed over the circumference, in order to simplify carrying out the assembly, so that shank segments L of different lengths are formed. The slits are made down to the bottom 8.3 of plastic ring 8 and have a slightly V-shaped or U-shaped form and a slit width of 2 to 3 mm. The aforementioned radial slitting takes place distributed over the circumference of the ring, preferably in an angle range between 15 and 25°.

As shown in the cross-sectional diagram according to Fig. 6, outer shank 8.1 is arranged on the outside circumference of the ring bottom 8.3, and angled off radially to the outside with reference to crosswise axis 2.2 of the piston, from the ring bottom 8.3, whereby inner shank 8.2 is angled off radially towards the inside, and is arranged on the inside circumference of the piston bottom 8.3.

As is evident from Fig. 4, U-shaped plastic ring 8 is radially divided in such a way that opening 17 with a mouth width M is formed. At 180° opposite to this there is a U-shaped opening 16 having approximately the same width, which extends over the radial center of ring bottom 8.3. Both openings 16 and 17 serve as the oil inlet and oil outlet, respectively, in the assembled state of the ring 8, to supply cooling channel 6 with oil.

According to Fig. 4 and to the enlarged detail view